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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/917,649	07/31/2001	Mark J. Feldstein	79856-US2	1077
26384 7590 04/30/2008 NAVAL RESEARCH LABORATORY ASSOCIATE COUNSEL (PATENTS) CODE 1008.2 4555 OVERLOOK AVENUE, S.W. WASHINGTON, DC 20375-5320				
EXAMINER				
LUDLOW, JAN M				
ART UNIT		PAPER NUMBER		
1797				
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04/30/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/917,649

Applicant(s)

FELDSTEIN, MARK J.

Examiner

Jan M. Ludlow

Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 29, 47-61 and 63-75 is/are pending in the application.
- 4a) Of the above claim(s) 48-55, 58-60 and 63-73 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 29, 47, 56, 57, 61, 74 and 75 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/7/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Art Unit: 1797

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

3. Determining the scope and contents of the prior art.
4. Ascertaining the differences between the prior art and the claims at issue.
5. Resolving the level of ordinary skill in the pertinent art.
6. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 29, 74, 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bolton (3976087).

8. Bolton teaches a first reservoir 20, second reservoir 34, each connected to a primary flow channel directly above pup 84. Tank 34 includes vent 48. Flow from 34 is achieved by pump 86 when vent 48 is opened to break vacuum (col. 5, lines 54-63).

9. Bolton fails to teach a vent on tank 20.

10. It would have been obvious to seal tank 20 and provide a vent in order to seal the water from evaporation and/or contamination as was known in the art. It would have been obvious to provide a vent in order to break the inherent vacuum of a sealed tank as taught with respect to tank 34. The scale of a tanker trunk inherently provides not low Reynolds number flow.

11. Claims 29, 47, 61, 74, 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brody ('404).

12. Brody teaches a device and method for moving fluids in a microfluidic device having fluid channels of less than 1mm across (col. 4, lines 5-6). In that the declaration filed December 7, 2005 under 37 CFR 1.131 states that the characteristic dimension defining low Reynolds number flow for aqueous systems is 100 μm (Page 7 of 7, lines 3-7), the range of 100 μm to 1 mm characteristic dimension taught by Brody is seen as satisfying the limitation of the last three lines of instant claim 29. Note that the fluid is not a positively recited element of the invention, and Reynolds number is dependent upon fluid characteristics, among other unclaimed variables. Thus, for some fluids (not claimed by applicant), the device of Brody is structurally capable of selective fluid drawing at not low Reynolds number flow because it includes characteristic dimensions that applicant states in that the declaration filed December 7, 2005 under 37 CFR 1.131 are characteristic of not low Reynolds number flow. Fluid can be switched from one flow path to another, mixed and separated (col. 2, lines 37-43). Flow is generated by adjusting the pressure at each of three reservoirs coupled to channels. The source of pressure at each reservoir can be a vacuum pump, atmosphere or a pressure regulator with variable output (bridge col. 4-5) coupled to a switching means, e.g., element 70 to select the pressure at each reservoir. Each of these devices will result in a particular flow rate for a particular fluid. To flow from a first reservoir to another via a "primary channel" without flowing from the second reservoir, $P_1 > P_2$ and $P_3 = P_J$ where P_J is the pressure at the junction (col. 5, lines 45-65). Brody teaches connection to atmosphere

(vent) and means to switch away from atmosphere, constituting an adjustable vent in the otherwise sealed reservoirs. The microfluidic switch can be used in a network of channels (col. 7, lines 10-35 and col. 8, lines 30-35) and with a detector (col. 6, lines 40-55). Note that the second reservoir in the instant claims corresponds to the third reservoir in Brody and the primary channel of the instant claims is coupled to the second reservoir of Brody. In the rejection, the examiner has used the terminology of the instant claims, but referenced the corresponding "P" of Brody.

13. Brody fails to explicitly teach an embodiment in which the primary channel is connected to a vacuum source and the first and second reservoirs coupled to atmosphere.

14. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a switchable pressure source including a vacuum source coupled to the primary channel (P2) and a switchable pressure source coupled to atmosphere to first (P1) and second (P3) reservoirs in order to provide $P1 > P2$ to cause flow from the first reservoir to the "primary channel" as taught by Brody. It would have been obvious to switch the pressure source coupled to the second reservoir (P3) away from vent, thereby sealing it, in accordance with equation 2. With respect to the instant "proviso", it is the examiner's position that the limitation is inherently met by the teaching of the pressure differentials achieved by vacuum and vent. How does the instantly claimed invention structurally differ from the invention of Brody in which the channels are 100 μm to 1mm and the pressure differential is achieved by vacuum and vents?

15. Claims 56, 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brody as applied to claims 29, 47, 61 above, and further in view of Heller or Feldstein (Fluorescence Array Biosensor Part 1: Optics and Fluidics).

16. Brody fails to teach a waveguide specific binding sensor.

17. Heller teaches a waveguide specific binding sensor in a microfluidic device.

18. Feldstein teaches a waveguide specific binding sensor in a microfluidic device.

19. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a waveguide specific binding sensor in the device of Brody in order to detect biological analytes in a microfluidic device as taught by Heller or Feldstein.

20. Applicant's arguments filed February 5, 2008 have been fully considered but they are not persuasive.

21. Applicant argues that it would not have been obvious to modify Bolton because to do so would destroy the function. This argument is not persuasive because the partial vacuum in conduit 44 is generated by the flow of liquid from tank 20 through line going through the induction manifold, analogous to the way a laboratory water aspirator works (on the Venturi principle). Breaking the vacuum on tank 20 would permit better flow from tank 20, causing a better pressure drop through the induction manifold (by ameliorating the competing vacuum upstream of the negative pressure pump) and producing vacuum in line 44 as described. Applicant further argues that the proviso of claim 29 is not met because fluid would flow from tank 20, but the proviso requires that

fluid flow from BOTH reservoirs, and there is no indication that fluid would flow from reservoir 34 without breaking the vacuum.

22. Applicant argues that Brody does not teach a dimension such that the selective fluid drawing is a low Reynolds number flow, but the examiner has relied upon evidence of record to demonstrate that Brody does in fact teach a dimension consistent with low Reynolds number flow. Applicant seeks to clarify that the declaration filed December 7, 2005 under 37 CFR 1.131 does not state that the characteristic dimension defining low Reynolds number flow for aqueous systems is 100 μm , but the evidence relied upon in the declaration does so state (Page 7 of 7, lines 3-7); thus it is completely appropriate for the Examiner to rely upon such evidence as applicant's own admission on the record. The examiner has not taken the statement out of context, as the context is a statement relied upon to demonstrate the date of invention of the instant invention. The examiner has also acknowledged that the Reynolds number is dependent upon flow rate and viscosity, and although the claims have now been amended to specify that the negative pressure source is configured to draw the fluid at a predetermined flow rate and the primary channel is dimensioned relative to the (predetermined) flow rate, the fluid is not a positively recited element of the invention. It is thus the examiner's position that for some fluid viscosities, Brody is capable of operation as claimed. Note that the instant claims are apparatus claims, not method claims.

23. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jan M. Ludlow whose telephone number is (571) 272-1260. The examiner can normally be reached on Monday, Tuesday and Thursday, 11:30 am - 8:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jan M. Ludlow
Primary Examiner
Art Unit 1797

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Primary Examiner, Art Unit 1797